

SUPPORT FOR THE AMENDMENT

Support for the amendment to claims 1 and 21 is found in claim 9 as originally presented. No new matter would be added to this application by entry of this amendment.

Upon entry of this amendment, claims 1-8 and 10-21 will remain active in this application.

REQUEST FOR RECONSIDERATION

The claimed invention is directed to a process for preparing autocatalytic polyether alcohols.

Autocatalytic polyether alcohols have been used in the preparation of polyurethanes. Autocatalytic polyether alcohols may contain tertiary amino groups which catalyze the urethane reaction and avoid the use of a separate tertiary amine catalysts which can migrate out of the polyurethane and create an unpleasant odor. In spite of avoiding the problem of migration associated with using a separate tertiary amine catalyst, autocatalytic polyether alcohols typically suffer from an odor problem with the polyurethanes and unsatisfactory age resistance for the polyurethane. Thus, production methods which can avoid significant formation of by-products are sought.

The claimed invention addresses this problem by providing a process for preparing autocatalytic polyether alcohol comprising reacting an H-functional starter substance having at least one catalytically active amino group and at least one group which is reactive with alkylene oxides, with alkylene oxides comprising a step of **dissolving the starter substance in a solvent** and **reacting a solution with alkylene oxides**. Applicants have discovered that reaction of starter substance, which is **dissolved in a solvent**, as a solution with alkylene oxides provides for an autocatalytic polyether alcohol of narrow molecular weight distribution, low by-product content and which has low amine emissions when used to prepare a polyurethane (page 3, lines 31-33 and page 8, lines 16-24 of applicants' specification). Such a process is nowhere disclosed or suggested in the cited references of record.

The rejections of claims 1-4, 6-8, 10-18 and 20-21 under 35 U.S.C. § 103(a) over Schilling et al. U.S. 6,423,759 in view of Waddington et al. U.S. 2003/0100699, of claim 5 under 35 U.S.C. § 103(a) over Schilling et al. in view of Waddington et al. in further view of

Maassen et al. U.S. 3,941,769 and of claim 19 under 35 U.S.C. § 103(a) over Schilling et al. in view of Waddington et al. in further view of Hinz et al. U.S. 5,476,969 are respectfully traversed.

None of the cited references disclose or suggest the claimed process of producing an autocatalytic polyether alcohol in which an H-functional starter substance which is a liquid at room temperature or reaction temperature is **dissolved in a solvent and reacted as a solution with alkylene oxides.**

Schilling et al. addresses a problem of producing polyether polyols from materials which are normally solid at ambient conditions, which were previously dissolved or suspended in a solvent prior to reaction.

Processes for the production of polyether polyols from materials which are normally solid at ambient conditions such as sucrose are known. **In many of the known processes, the solid material is dissolved or suspended in a solvent** prior to reaction with the selected alkylene oxide(s) to facilitate processing of the reaction mixture. (column 1, lines 31-18)

However, the use of a solvent to facilitate processing of a solid starter material is describe as having detrimental effects.

First, the solvent takes up space in the reactor which might otherwise be used to produce **larger batches** of polyol. Second, the solvent or unreacted **water must be removed**, usually by distillation. Such removal consumes both time and energy. Finally, if water is used to suspend or dissolve the sucrose, difunctional glycols which **reduce the average functionality** of the polyol produced are formed. One proposed solution to this problem is removal of the solvent by distillation after a portion of the alkylene oxide has been added. (See, e.g., U.S. Pat. No. 3,085,085 which discloses removal of water by distillation.) Such removal of water after adding and reacting a portion of the total alkylene oxide desired reduces the amount of glycols formed and allows for a larger batch size but still consumes time and energy. Column 1, lines 19-25)

The patent addresses this issue by providing a method in which a solid polyhydroxyl initiator is suspended in an amine-initiated polyol, which is heated and alkoxyated.

These and other objects which will be apparent to those skilled in the art are accomplished by suspending a solid polyhydroxyl initiator having a functionality of at least 4 and a melting or decomposition point above 95° C. in an amine-initiated polyol, heating the

suspension, (preferably, in the presence of an alkaline catalyst) and alkoxyating the resultant mixture. (column 2, lines 42-49).

As a result of adding the solid polyhydroxyl compound to the a liquid amine-initiated polyol, a solution or suspension is formed.

[T]he solid polyhydroxyl compound initiator is added to the liquid amine-initiated polyol and stirred, mixed or agitated sufficiently to disperse the polyhydroxyl compound initiator in the amine-initiated polyol and form a solution or a suspension. (Column 3, lines 53-57).

Thus, the patent makes clear the necessity of solvent use to dissolve solid starter materials, although the use of solvent presents difficulties in terms of increased reaction size, and the energy needed for solvent removal. None, the less, a solvent, or an amine-initiated polyol, is identified as necessary when reaction solid starter materials.

In contrast, the claimed invention is directed to a process for preparing an autocatalytic polyether alcohol, by reacting specific H-functional substances, which are a **liquid at room temperature and at reaction temperature**, by dissolving in a solvent. Applicants have discovered that dissolution of the liquid starter substance in a solvent provides for a narrow molecular weight distribution and suppression of secondary reactions.

Page 14 of the official action asserts that applicants' position that the claimed initiators are liquid at room temperature is not supported by any factual data an[d] appears to be an unsubstantiated opinion which cannot be substituted for fact.

Applicants respectfully submit that the melting point of a compound is not an opinion but rather is based on an empirical observation as to the temperature in which a crystalline structure is lost. Such a melting temperature would be readily apparent to one of ordinary skill in the art, using simple analytical chemistry techniques. However, in support of applicants' assertion, applicants have compiled the attached table identifying the melting points of the many of the claimed starter compounds, as well as the source of the analytical

data. The identified melting points are as follows: dimethylaminoethylamine (-40°C), dimethylaminopropylamine (< -70°C), diethylaminoethylamine (30°C), diethylaminopropylamine (47°C), dimethylethanolamine (-70°C), N,N-dimethylaminoethyl N'-methyl-N'-hydroxyethylaminoethyl ether (-25°C), N,N-dimethylaminoethoxyethanol (-70°C), N-(3-aminopropyl)imidazole (-68°C) and N-(2-dimethylaminoethyl)-N-methylethanolamine (-50°C). Applicants further note that the starter compounds with identified melting point is the subject matter of claim 21.

It would not have been obvious to dissolve a **liquid starter substance** in a solvent since a liquid starter substance is not in need of dissolution in order to facilitate processing of the reaction mixture.

As already noted, the use of a solvent for use with a solid starter substance was known but the detriment of reduced efficiency in terms of reaction volume and solvent removal was accepted as necessary to achieve facile processing of the solid starter substance. Accordingly, while the use of a solvent with a **solid starter** substance might be recognized as necessary and therefore obvious, the use of a solvent with a **liquid starter** substance is not necessary and therefore not obvious. Why would one of ordinary skill in the art use a solvent with a liquid substance, incurring the detriments of increase reaction volume and necessitating removal of solvent, when a liquid starter substance is already liquid? Alternatively, what advantages would one of skill in the art **expect to realize** by use of a solvent, which would outweigh the expected detriments. There simply would be no motivation to use a solvent with such liquid starter substances as there would be no expected advantage from the use of a solvent and the use of a solvent would incur well recognized deficiencies.

Even though Waddington et al has been cited for motivation to form autocatalytic polyols, there is **no motivation to use a solvent** in forming autocatalytic polyols from

catalytic amine starter substances which are **a liquid at room temperature** and at processing temperature.

Thus, since the cited references fail to suggest a step of dissolving a liquid starter compound having a catalytically reactive amine group in a solvent, the claimed process would not have been obvious and withdrawal of the rejection under 35 U.S.C. 103 (a) is respectfully requested.

Moreover, applicants observe a reduction in odor for a polyurethane prepared as claimed by dissolving a starter substance with a catalytically active amine group in a solvent.

The examiner's attention is directed to examples 8 and 9 appearing on pages 10 and 11 of applicants' specification. Example 8 prepared with the autocatalytic polyol of example 2 (no solvent) was tested for VOC at 20 ppm containing dimethylamino groups. In contrast, example 9, prepared using autocatalytic polyol from example 3 (polyether alcohol solvent) was tested and no VOC was detected. Thus, applicants have demonstrated that an autocatalytic polyol as claimed produces a polyurethane of reduced VOC as compared with using an autocatalytic polyol prepared in the absence of a solvent. Such a result is not suggested by either of Schilling et al. or Waddington et al.

While page 15 of the official action asserts that a reduction of VOC is an expected result from using an autocatalytic polyol, applicants note that the demonstrated **comparison used the same autocatalytic polyol**, only differing in the use of a solvent. Thus, the reduction in VOC by using a solvent relative to using an autocatalytic polyol in the absence of a solvent is not suggested.

In view of the deficiencies of the cited references, the claimed invention is not rendered obvious by the cited combination of references and withdrawal of the rejections under 35 U.S.C. §103(a) is respectfully requested.

The rejection of claims 1, 6-8, 10-11 and 15-21 under 35 U.S.C. 112, first paragraph, enablement is respectfully traversed.

Applicants respectfully submit that one of ordinary skill in the art would be enabled to practice the claimed invention, involving dissolving specific liquid amino compounds in a solvent, without undue experimentation.

Schilling et al. recognize that the use of a solvent to dissolve **solid** starter substances is known to those of skill in the art.

Processes for the production of polyether polyols from materials which are normally solid at ambient conditions such as sucrose are known. **In many of the known processes, the solid material is dissolved or suspended in a solvent** prior to reaction with the selected alkylene oxide(s) to facilitate processing of the reaction mixture. (column 1, lines 31-18)

Thus, in the context of reacting a solid starter substance with an alkylene oxide, those of ordinary skill in the art would understand how to select a suitable solvent material to dissolve the solid starter substance and react with an alkylene oxide, without undue experimentation.

One difference between the process disclosed by Schilling et al. and the claimed invention is the use of a liquid starter substance. One of ordinary skill in the art would clearly be able to select suitable solvents which would dissolve the liquid starter substance and still be reacted with an alkylene oxide as the technique as applied to a solid starter substance is already known.

Further more, a patent need not teach, and preferably omits, what is well known in the art (Hybritech Inc. v. Monoclonal Antibodies, Inc. 231 U.S.P.Q. 81, 94 (Fed. Cir. (1986))).

On page 2 of applicants' specification is a statement that "it is possible to use any organic solvents. Such statement must be taken as in compliance with the enablement issue unless the examiner has reasons to doubt the objective truth of applicants' disclosure.

The examiner has provided no reasons to doubt the objective truth of applicants' statement.

In assessing the Wands factors on pages 4 and 5 of the official action, the examiner has only discussed factors (f), (g), (a) and (h) and apparently ignored factors (b) the nature of the invention (e.g. dissolution of specific liquid amine compounds in a solvent), (c) the state of the art (known to use solvents to dissolve solid substances), (d) the level of skill of ordinary skill in the art and (e) the level of predictability in the art. As the general technique of dissolving solid starter substances in a solvent is known, the level of experimentation necessary to practice the claimed invention in which specific liquid substances are dissolved in a solvent, would not have been undue.

Further, even though the examiner has discussed factors (f), (g), (a) and (h) of the *Wands* factors, the examiner has provided to reason to doubt the objective truth of applicants' disclosure.

Moreover, the burden is on the Patent Office to provide reasons based on scientific principles, to doubt the objective enablement of Applicant's claimed invention. Applicant's disclosure must be taken as in compliance with the enabling requirement under 35 USC 112, first paragraph, unless, there is reason to doubt the objective truth of the statements contained therein. (*In re Marzocchi*, 169 USPQ 367, 369 (CCPA 1971)). In view of the failure of the office to meet its burden, withdrawal of the rejection under 35 U.S.C. § 112, first paragraph is respectfully requested.

The provisional rejection of claims 1, 4, 6, 7, 8, 10, 11, 14-16 and 19-21 under the judicially created doctrine of obviousness-type double patenting is respectfully traversed.

Applicants note that as of July 30, 2009, the status of U.S. 10/495,199 in the USPTO PAIR data base is "Abandoned --Failure to Response to an Office Action." Accordingly a provisional rejection based on this currently abandoned application would not be proper.

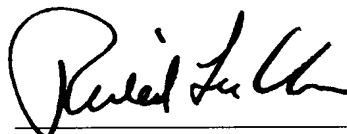
Further, if a rejection based the reference applied as prior art were made, applicants note that the specification of U.S. 10/459,199¹ fails to disclose dissolution of an autocatalytic starter substance in a solvent. Paragraph [0029] of the publication describes simple reaction of the initiator with alkylene oxides under conventional temperatures and pressures. No step of dissolution of a liquid starter substance is disclosed. As such, the claimed invention which recites dissolution of specific amino group containing starter substances in a solvent would not have been obvious from this disclosure.

Accordingly, in view of the abandoned status of 10/459,199 the provisional ground of rejection should be abandoned.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

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¹ U.S. 10/495,199 is a 371 application of PCT/EP02/12493 which published as WO/2003/042281 on May 22, 2003.